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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,444	03/12/2004	Boyd T. Tolton	LAMA122586	6250
26389 7590 06/05/2007 CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC 1420 FIFTH AVENUE SUITE 2800 SEATTLE, WA 98101-2347			EXAMINER MALEVIC, DJURA	
			ART UNIT 2884	PAPER NUMBER
			MAIL DATE 06/05/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/799,444

Applicant(s)

TOLTON ET AL.

Examiner

Djura Malevic

Art Unit

2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 20-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**Response to Amendment**

The amendment filed 2/21/2007 was entered.

**Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,2,5, 7, 11,12,13,15,16, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. (US Patent 6,750,453 B1) in view of Griggs et al. (US Patent 4,520,265).

With regards to claim 1, Nelson discloses a method of detecting gases in the free atmosphere comprising traversing a target area with a gas correlation radiometer (GCR) tuned to detect the presence of ethane and identifying a gas leak upon a gas filter correlation radiometer (Col. 4, Line 59; Col. 1, Line 30++; Col. 21, Line 62). Nelson fails to disclose detecting variations in solar radiation reflected from the target area. Griggs teaches detecting solar radiation (Col. 2, Line 28-46). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Nelson to include detecting solar radiation such as that taught by Griggs in order to eliminate such background to improve the overall detection.

With regards to claim 2, Nelson discloses detection along the wavenumber 2970 to  $3005\text{cm}^{-1}$ , thus discloses the claimed wavenumber of  $3000\text{cm}^{-1}$  (Col. 21, Line 6).

With regards to claim 5, Nelson discloses a gas filter correlation radiometer (Figure 1) comprising: a window 63 in a housing; optics defining a first 78 and second 76 optical paths between the window 63 and the detectors 82 and 86; a beam splitter 72 as part of the optics for directing radiation from the window 63 and dividing the radiation between two optical paths; wherein said optical paths comprise a first ethane and a second ethane optical paths being different in lengths and electronics 88 and 89 for processing signals from the detectors 82 and 86.

With regards to claim 7, Nelson discloses detection along the wavenumber 2970 to  $3005\text{cm}^{-1}$ , thus discloses the claimed wavenumber of  $3000\text{cm}^{-1}$  (Col. 21, Line 6).

With regards to claim 11, Nelson discloses an optical path provided with a gas filter containing ethane (Col. 10, Line 64++; Col. 21, Line 4; Col. 21, Line 62).

With regards to claim 12, Nelson discloses two optical paths with different lengths capable of detecting ethane (Col. 10, Line 64++; Col. 21, Line 4; Col. 21, Line 63).

With regards to claim 13, Nelson discloses two detectors 82 and 86 having collocated fields of view and sampling synchronously (Figure 1), (Col. 21, Line 62).

With regards to claim 15, Nelson discloses mounting the correlation radiometer on an airborne vehicle (Fig 19).

With regards to claim 16, Nelson discloses the gas leak located along a pipeline and detection of gas leaks is carried only using ethane (Col. 1, Line 30++).

Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. (US Patent 6,750,453 B1) in view of Hodgkinson (International Publication WO 01/94916).

With regards to claims 3 and 8, Nelson discloses a method of detecting gas leaks as claimed in claims 1 and 5, and further discloses that the gas filters are configured for ethane, such that the optimized central wavelength and the optimized band-pass provides substantially increased sensitivity to ethane gas and substantially increases selectivity of ethane gas. Furthermore, Nelson discloses that the said filter consists of a specific band-pass and central wavelength, which avoids erroneous detection of any competitive gases (other than ethane). The said filter responds to wavelengths with a band corresponding to strong absorption by the specific target (ethane). Moreover, Nelson discloses filters for ethane comprising a band of  $2970$  to  $3005\text{ cm}^{-1}$  and a process for obtaining an ethane-optimal central wavelength to increased sensitivity to ethane as the target gas. Nelson does not expressly disclose the absorption peak at a bandwidth of  $2850$  to  $3075\text{ cm}^{-1}$  (Col.13, Line 61; Col. 21, Line 3; Col. 21, Line 62).

However, the absorption peak at a bandwidth of  $2850$  to  $3075\text{ cm}^{-1}$  is well known in the art. For example, a reference such as Hodgkinson (International Publication WO 01/94916) teaches an ethane absorption spectrum of  $2815$  to  $3100\text{ cm}^{-1}$  (Figure 2). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Nelson to include an absorption bandwidth such as that

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taught by Hodgkinson in order to increase captured signals which in turn provides additional sensitivity.

Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. (US Patent 6,750,453 B1) in view of what is old and well known.

With regards to claims 4 and 9, Nelson discloses the claimed invention according to claims 1 and 5 but does not expressly disclose the gas filter correlation radiometer tuned to detect ethane using an absorption peak at a bandwidth of  $150\text{cm}^{-1}$  above or below  $3000\text{cm}^{-1}$ . However, any specific band would have been an obvious matter of design choice. Since it is known in the art that a wideband would lead to increased sensitivity by increasing the captured signals, it would have been obvious to one skilled in the art at the time the invention was made to include a bandwidth of  $150\text{cm}^{-1}$  above or below  $3000\text{cm}^{-1}$  to further increase sensitive of the detector as is well known in the art. Additionally, it has been held that where the general conditions of a claim are disclose in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

Claims 6, 10, 14, 18, 20, 24 and 25, are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. in view of French (US Patent 4,676,642).

With regards to claims 6, Nelson discloses the method of detecting gas leaks and a gas filter as claimed in claims 5, but does not expressly disclose the beam splitter comprising a biprism. However, French teaches that partitioning may be accomplished in a number of ways including utilizing a biprism (Abstract). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to

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modify Nelson to expressly include a beam splitter comprising a biprism such as that taught by French, since biprisms are known for partitioning light with great efficiency.

With regards to claim 10, Nelson discloses detection along the wavenumber 2970 to 3005  $\text{cm}^{-1}$ , thus discloses the claimed wavenumber of 3000  $\text{cm}^{-1}$  (Col. 21, Line 6).

With regards to claims 14 and 27, Nelson discloses the method for detecting gas leaks as claimed in claim 5 but does not expressly disclose using a pushbroom imaging technique. However, Nelson discloses detecting in a direction perpendicular to the ground surface while moving in an aircraft, thus it is obvious that Nelson is using a pushbroom technique. It is also obvious that the pushbroom technique detects simultaneously as the field of view changes in time and/or in placement.

With regards to claims 18, Nelson discloses a gas filter correlation radiometer (Figure 1) comprising a window 63 in a housing, optics defining a first 78 and second 76 optical paths between the window 63 and the detectors 82 and 86, a beam splitter 72 as part of the optics for directing radiation from the window 63 and dividing the light between optical paths, ethane optical paths being different lengths from each other and electronics 88 and 89 for processing signals from the detectors 82 and 86. However, Nelson does not expressly disclose the beam splitter consisting a bi-prism. French teaches that partitioning may be accomplished in a number of ways including utilizing a biprism (Abstract). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Nelson to expressly include a beam

splitter comprising a biprism such as that taught by French, since biprisms are known for partitioning light with great efficiency.

With regards to claim 20, Nelson discloses detection along the wavenumber 2970 to 3005 $\text{cm}^{-1}$ , thus discloses the claimed wavenumber of 3000 $\text{cm}^{-1}$  (Col. 21, Line 6).

With regards to claim 24, Nelson discloses a first optical path incorporating a gas filter containing ethane (Col. 10, Line 64++; Col. 21, Line 4; Col. 21, Line 62).

With regards to claim 25, Nelson discloses a second gas path length lower than first gas path length (Figure 1).

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson in view of Smith et al. (US Patent 6,756,592 B1).

With regards to claim 17, Nelson discloses the method for detecting gas leaks as claimed in claim 1 but does not expressly disclose the gas leak detected as part of reservoir mapping process. References such as Smith et al. (US Patent 6,756,592 B1) teach high-resolution maps showing the distribution of gas leaks (Col. 3, Line 36) (Figure 1). Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify Nelson to include the mapping system such as that taught by Smith because mapping gas leaks would increase the users understanding of the area being surveyed.

Claims 21, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. in view of French (US Patent 4,676,642) and Hodgkinson (International Publication WO 01/94916).

With regards to claims 21, Nelson discloses a gas filter correlation radiometer (Figure 1) comprising a window 63 in a housing, optics defining a first 78 and second 76 optical paths between the window 63 and the detectors 82 and 86, a beam splitter 72 as part of the optics for directing radiation from the window 63 and dividing the radiation between optical paths, ethane optical paths being different lengths from each other, electronics 88 and 89 for processing signals from the detectors 82 and 86 and detection along the wavenumber 2970 to 3005  $\text{cm}^{-1}$  (Col. 21, Line 6). Nelson does not expressly disclose the beam splitter comprising a bi-prism and an ethane absorption peak at a bandwidth of at least 2850 to 3075  $\text{cm}^{-1}$ .

French teaches that partitioning may be accomplished in a number of ways including utilizing a biprism (Abstract). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Nelson to expressly include a beam splitter comprising a biprism such as that taught by French, since biprisms are known for partitioning.

Also, the absorption peak at a bandwidth of 2850 to 3075  $\text{cm}^{-1}$  is well known in the art. For example, a reference such as Hodgkinson (International Publication WO 01/94916) teaches an ethane absorption spectrum of 2815 to 3100  $\text{cm}^{-1}$  (Figure 2). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Nelson to include an absorption bandwidth such as that taught by Hodgkinson in order to increase captured signals which in turn provides additional sensitivity.

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With regards to claim 22, Nelson discloses the claimed invention as claimed in claim 21 but does not expressly disclose the gas filter correlation radiometer tuned to detect ethane using an absorption peak at a bandwidth up to  $150\text{ cm}^{-1}$  above or below  $3000\text{ cm}^{-1}$ . However, any specific band would have been an obvious matter of design choice. Since it is known in the art that a wideband would lead to increased sensitivity by increasing the captured signals, it would have been obvious to one skilled in the art at the time the invention was made to include a bandwidth of  $150\text{ cm}^{-1}$  above or below  $3000\text{ cm}^{-1}$  to further increase sensitive of the detector as is well known in the art. Additionally, it has been held that where the general conditions of a claim are disclose in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

With regards to claim 23, Nelson discloses the claimed invention according to claim 21 but does not expressly disclose the gas filter correlation radiometer tuned to detect ethane using an absorption peak at a bandwidth of  $150\text{ cm}^{-1}$  above or below  $3000\text{ cm}^{-1}$ . However, any specific band would have been an obvious matter of design choice. Since it is known in the art that a wideband would lead to increased sensitivity by increasing the captured signals, it would have been obvious to one skilled in the art at the time the invention was made to include a bandwidth of  $150\text{ cm}^{-1}$  above or below  $3000\text{ cm}^{-1}$  to further increase sensitive of the detector as is well known in the art. Additionally, it has been held that where the general conditions of a claim are disclose in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

**Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Zwick (US Patent 4,543,481).

With regards to claim 1, Zwick discloses a method of detecting gas leaks comprising traversing a target area with a gas filter correlation radiometer having a field of view oriented towards the target area, wherein the said radiometer is tuned to detect ethane and identifying a gas leak upon detecting the presence of ethane (Col. 1, Line 9 – 40). Zwick fails to disclose detecting variations in solar radiation reflected from the target area. Griggs teaches detecting solar radiation (Col. 2, Line 28 -46). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Zwick to include detecting solar radiation such as that taught by Griggs in order to eliminate such background to improve the overall detection.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zwick and Griggs in view of Hodgkinson (WO 01/94916).

With regards to claim 2, Zwick discloses the claim invention according to claim 1, but fails to disclose an ethane absorption peak at  $3000\text{cm}^{-1}$ . Hodgkinson discloses an ethane absorption peak at approximately  $3000\text{cm}^{-1}$  (Figure 2). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Zwick to include an absorption bandwidth such as that taught by Hodgkinson in order to increase the captured signals which provides additional sensitivity.

#### **Response to Arguments**

Applicant's arguments, see Remarks, filed 02/21/2007, with respect to the rejection(s) of claim(s) 1 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Griggs et al. (US Patent 4,520,265) (see above).

With regards to claims 18 and 21, applicant claims that French does not disclose the function of the biprism in a similar matter. Biprisms are well known in the art and conventionally used. As discussed in the rejection to claim 18, biprisms are known for partition light with great efficiency, for example Fateley (US Patent 4,750,834) also uses a biprism in order to divide two separate beams of light (Col. 1, Light 31). Therefore, the particular use would be obvious to what is well known.

#### **Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Djura Malevic whose telephone number is 571.272.5975. The examiner can normally be reached on Monday - Friday between 8:30am and 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

***Djura Malevic***  
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